# CLAIMS APPENDIX

## PENDING CLAIMS ON APPEAL OF U.S. PATENT APPLICATION SERIAL NO. 11/105,106

1. A method for measuring usage of media data received at a user location, the media data being reproducible as comprehensible images or comprehensible sounds and having ancillary codes in at least some of the media data, comprising:

receiving the media data in a monitoring device at the user location;

forming, without processing the media data sufficiently to decode an ancillary code, a data set in the monitoring device from the media data by including in the data set, data sufficient to decode the ancillary codes in the media data, while excluding from the data set, data required either to reproduce the comprehensible images or the comprehensible sounds;

communicating the data set to a processing system located remotely from the user location; and

at the remotely located processing system, processing the data set to decode the ancillary codes.

2. A method according to Claim 1, wherein forming a data set comprises transforming at least a portion of the received media data into frequency-domain data.

3. The method of Claim 2, wherein forming a data set comprises producing amplitude data for each of a plurality of frequency ranges of the frequency-domain data, each frequency range corresponding to a predetermined component of the ancillary codes.

4. The method of Claim 3, wherein the amplitude data are each formed as a ratio of amplitude data in a corresponding frequency range to a noise level based on amplitude data outside such corresponding frequency range.

5. The method of Claim 1, wherein the data set comprises data representing time-domain information.

6. The method of Claim 5, wherein the time-domain data comprises data from a frequency range narrower than a frequency range of the media data.

7. The method of Claim 1, wherein the data set comprises data representing phase information.

8. The method of Claim 1, wherein the media data comprises audio data.

9. The method of Claim 1, wherein the media data comprises video data.

10. The method of Claim 1, wherein the media data is received as acoustic energy.

11. The method of Claim 1, wherein the media data is received as electromagnetic energy.

12. The method of Claim 11, wherein the media data is received as light energy.

13. The method of Claim 1, wherein the media data is received as magnetic energy.

14. The method of Claim 1, wherein the media data is received as electrical energy.

15. The method of Claim 1, wherein processing the data set to decode the ancillary codes comprises processing frequency-domain data.

16. The method of Claim 15, wherein the frequency-domain data is processed to decode components of the ancillary codes at predetermined frequencies.

17. The method of Claim 15, wherein the frequency-domain data is processed to decode code components of the ancillary codes distributed according to a frequency-hopping pattern.

18. The method of Claim 17, wherein the code components comprise pairs of frequency components modified in amplitude to encode information.

19. The method of Claim 17, wherein the code components comprise pairs of frequency components modified in phase to encode information.

20. The method of Claim 1, wherein processing the data set to decode the ancillary codes comprises detecting a spread spectrum code.

21. The method of Claim 1, wherein receiving media data comprises receiving media data in a portable monitoring device carryable on the person of a user.

22. A system for measuring usage of media data received at a user location, the media data being reproducible as comprehensible images or comprehensible sounds and having ancillary codes in at least some of the media data, comprising:

a monitoring device at the user location and having an input to receive the media data;

a first processor at the user location coupled with the monitoring device to receive the media data and operative to form, without processing the media data sufficiently to decode an ancillary code, a data set including data sufficient to decode the ancillary codes in the media data, while excluding from the data set data required either to reproduce the comprehensible images or the comprehensible sounds;

a first communications device coupled with the first processor to receive the data set and operative to communicate the data set to a processing system located remotely from the user location;

a second communications device at the processing system coupled with the first communications device to receive the data set; and

a second processor at the processing system and having an input coupled with the second communications device to receive the data set received by the second communications device, the second processor being operative to process the data set to decode the ancillary codes.

23. The system of Claim 22, wherein the first processor is operative to form the data set by transforming at least a portion of the received media data into frequency-domain data.

24. The system of Claim 23, wherein the processor is operative to produce amplitude data for each of a plurality of frequency ranges of the frequency-domain data, each frequency range corresponding to a predetermined component of the ancillary codes.

25. The system of Claim 24, wherein the processor is operative to form each of the amplitude data as a ratio of amplitude data in a corresponding frequency range to a noise level based on amplitude data outside such corresponding frequency range.

26. The system of Claim 22, wherein the monitoring device comprises a portable monitoring device carryable on the person of a user.

27. The system of Claim 22, wherein the first processor is operative to include time-domain data in the data set.

28. The system of Claim 27, wherein the time-domain data comprises data from a frequency range narrower than a frequency range of the media data.

29. The system of Claim 22, wherein the first processor is operative to include data representing phase information in the data set.

30. The system of Claim 22, wherein the monitoring device is operative to receive the media data as acoustic energy.

31. The system of Claim 22, wherein the monitoring device is operative to receive the media data as electromagnetic energy.

32. The system of Claim 31, wherein the monitoring device is operative to receive the media data as light energy.

33. The system of Claim 22, wherein the monitoring device is operative to receive the media data as magnetic energy.

34. The system of Claim 22, wherein the monitoring device is operative to receive the media data as electrical energy.

35. The system of Claim 22, wherein the second processor is operative to process the frequency-domain data to decode the ancillary codes.

36. The system of Claim 35, wherein the second processor is operative to process the frequency-domain data by detecting components of the ancillary codes at predetermined frequencies to decode the ancillary codes.

37. The system of Claim 35, wherein the second processor is operative to process the frequency-domain data to decode code components distributed according to a frequency-hopping pattern.

38. The system of Claim 37, wherein the second processor is operative to decode the ancillary codes by detecting pairs of frequency components modified in amplitude to encode information.

39. The system of Claim 37, wherein the second processor is operative to decode the ancillary codes by detecting pairs of frequency components modified in phase to encode identification information.

40. The system of Claim 22, wherein the second processor is operative to decode the ancillary codes in the form of spread spectrum codes.

41. A system for measuring usage of media data received at a user location, the media data being reproducible as comprehensible images or comprehensible sounds and having ancillary codes in at least some of the media data, such media data not having been processed to decode an ancillary code, comprising:

a communications device at a processing facility located remotely from a user location, the communications device having an input to receive a data set including data sufficient to decode the ancillary codes in the media data, while excluding data required to either reproduce the comprehensible images or the comprehensible sounds; and

a processor located at the processing facility and coupled with the communications device to receive the data set and operative to process the data set to decode the ancillary codes.

42. The system of Claim 41, wherein the processor is operative to decode the ancillary codes by processing frequency-domain data.

43. The system of Claim 42, wherein the processor is operative to detect components of the ancillary codes at predetermined frequencies to decode the ancillary codes.

44. The system of Claim 42, wherein the processor is operative to decode components of the ancillary codes distributed according to a frequency-hopping pattern.

45. The system of Claim 44, wherein the processor is operative to decode pairs of ancillary code frequency components modified in amplitude to encode information.

46. The system of Claim 44, wherein the processor is operative to decode pairs of ancillary code frequency components modified in phase to encode information.

47. The system of Claim 41, wherein the processor is operative to decode the ancillary codes in the form of spread spectrum codes.

48. A system for measuring usage of media data received at a user location, the media data being reproducible as comprehensible images or comprehensible sounds and having ancillary codes in at least some of the media data, comprising:

means for receiving the media data at the user location;

means at the user location for forming, without processing the media data sufficiently to decode an ancillary code, a data set from the media data by including in the data

set, data sufficient to decode the ancillary codes in the media data, while excluding from the data set, data required either to reproduce the comprehensible images or the comprehensible sounds;

means for communicating the data set to a processing system located remotely from the user location; and

processing means at the processing system for processing the data set to decode the ancillary codes.

49. The system of Claim 48, wherein the means for forming a data set is operative to transform at least a portion of the received media data into frequency-domain data.

50. The system of Claim 49, wherein the means for forming a data set is operative to produce amplitude data for each of a plurality of frequency ranges of the frequency-domain data, each frequency range corresponding to a predetermined component of the ancillary codes.

51. The system of Claim 50, wherein the means for forming a data set is operative to form each of the amplitude data as a ratio of amplitude data in a corresponding frequency range to a noise level based on amplitude data outside such corresponding frequency range.

52. The system of Claim 48, wherein the means for forming the data set is operative to include data representing time-domain information therein.

53. The system of Claim 52, wherein the means for forming a data set is operative to select the time-domain data from a frequency range narrower than a frequency range of the media data.

54. The system of Claim 48, wherein the means for forming a data set is operative to include data representing phase information therein.

55. The system of Claim 48, wherein the means for receiving media data is operative to receive the media data as acoustic energy.

56. The system of Claim 48, wherein the means for receiving media data is operative to receive the media data as electromagnetic energy.

57. The system of Claim 56, wherein the means for receiving media data is operative to receive the media data as light energy.

58. The system of Claim 48, wherein the means for receiving media data is operative to receive the media data as magnetic energy.

59. The system of Claim 48, wherein the means for receiving media data is operative to receive the media data as electrical energy.

60. The system of Claim 48, wherein the processing means is operative to process frequency-domain data to decode the ancillary codes.

61. The system of Claim 60, wherein the processing means is operative to detect components of the ancillary codes at predetermined frequencies to decode the ancillary codes.

62. The system of Claim 60, wherein the processing means is operative to detect code components distributed according to a frequency-hopping pattern to decode the ancillary codes.

63. The system of Claim 62, wherein the processing means is operative to decode the ancillary codes by detecting pairs of frequency components modified in amplitude to encode information.

64. The system of Claim 62, wherein the processing means is operative to decode the ancillary codes by detecting pairs of frequency components modified in phase to encode information.

65. The system of Claim 48, wherein the processing means is operative to decode a spread spectrum code as the ancillary code.

66. The system of Claim 48, wherein the means for receiving the media data comprises a portable monitoring device carryable on the person of an audience member.

67. A system for measuring usage of media data received at a user location, the media data being reproducible as comprehensible images or comprehensible sounds and having ancillary codes in at least some of the media data, such media data not having been processed to decode the ancillary codes, comprising:

means for receiving a data set at a processing system located remotely from the user location, the data set including data sufficient to decode the ancillary codes in the media data, while excluding data required either to reproduce the comprehensible images or the comprehensible sounds; and

processing means located at the processing system for processing the data set to decode the ancillary codes.

68. The system of Claim 67, wherein the processing means comprises means for processing frequency-domain data to decode the ancillary codes.

69. The system of Claim 68, wherein the processing means is operative to process the frequency-domain data to decode components of the ancillary codes at predetermined frequencies.

70. The system of Claim 68, wherein the processing means is operative to process the frequency-domain data to decode components of the ancillary codes distributed according to a frequency-hopping pattern.

71. The system of Claim 70, wherein the processing means is operative to decode pairs of ancillary code frequency components modified in amplitude to encode information.

72. The system of Claim 70, wherein the processing means is operative to decode pairs of ancillary code frequency components modified in phase to encode information.

73. The system of Claim 67, wherein the processing means is operative to decode the ancillary codes in the form of spread spectrum codes.

74. A method for measuring usage of media data received at a user location, the media data being reproducible as comprehensible images or comprehensible sounds and having ancillary codes in at least some of the media data, such media data not having been processed to decode the ancillary codes, comprising:

receiving a data set at a processing system located remotely from the user location, the data set including data sufficient to decode the ancillary codes in the media data, while excluding data required either to reproduce the comprehensible images or the comprehensible sounds; and

at the remotely located processing system, processing the data set to decode the ancillary codes.

75. The method of Claim 74, wherein processing the data set to decode the ancillary codes comprises processing frequency-domain data.

76. The method of Claim 75, wherein the frequency-domain data is processed to decode components of the ancillary codes at predetermined frequencies.

77. The method of Claim 75, wherein the frequency-domain data is processed to decode components of the ancillary codes distributed according to a frequency-hopping pattern.

78. The method of Claim 77, wherein the code components comprise pairs of frequency components modified in amplitude to encode information.

79. The method of Claim 77, wherein the code components comprise pairs of frequency components modified in phase to encode information.

80. The method of Claim 74, wherein processing the data set to decode the ancillary codes comprises detecting a spread spectrum code.

81. A method for measuring usage of media data received at a user location, comprising:

receiving media data representing information in a monitoring device at the user location;

forming, without processing the media data sufficiently to decode an ancillary code, a data set in the monitoring device representing some, but not all, of the information represented by the media data;

communicating the data set to a processing system located remotely from the user location; and

at the processing system, processing the data set to decode an ancillary code for the media data.

82. The method of claim 81 wherein forming a data set comprises transforming at least a portion of the received media data into frequency-domain data.

83. The method of claim 82, wherein forming a data set comprises producing amplitude data for each of a plurality of frequency ranges of the frequency-domain data, each frequency range corresponding to a predetermined code component.

84. The method of claim 83, wherein the amplitude data are each formed as a ratio of amplitude data in a corresponding frequency range to a noise level based on amplitude data outside such corresponding frequency range.

85. The method of claim 81, wherein receiving media data comprises receiving media data in a portable monitoring device carryable on the person of a user.

86. The method of claim 81, wherein processing the data set comprises processing frequency-domain data.

87. The method of claim 86, wherein the frequency-domain data is processed to decode components of the identification code at predetermined frequencies.

88. A method for measuring usage of media data representing information and received at a user location, such media data not having been processed to decode an ancillary code, comprising:

receiving a data set at a processing system located remotely from the user location, the data set representing some, but not all, of the information represented by the media data; and

at the processing system, processing the data set to decode an ancillary code for the media data.

89. The method of Claim 88, wherein processing the data set comprises processing frequency-domain data.

90. The method of Claim 89, wherein the frequency-domain data is processed to decode components of the identification code at predetermined frequencies.

91. A system for measuring usage of media data representing information received at a user location, such media data not having been processed to decode an ancillary code, comprising:

means for receiving a data set at a processing system located remotely from the user location, the data set representing some, but not all, of the information represented by the media data; and

processing means located at the processing system for processing the data set to decode an ancillary code for the media data.

92. The system of Claim 91, wherein the processing means is operative to process frequency-domain data to decode the identification code.

93. The system of Claim 92, wherein the processing means is operative to process the frequency-domain data to decode components of the identification code at predetermined frequencies.

94. A system for measuring usage of media data received at a user location, comprising:

means for receiving media data representing information at the user location;

data set forming means at the user location for forming, without processing the media data sufficiently to decode an ancillary code, a data set representing some, but not all, of the information represented by the media data;

means for communicating the data set to a processing system located remotely from the user location; and

processor means at the processing system for processing the data set to decode an ancillary code for the media data.

95. The system of Claim 94, wherein the data set forming means is operative to form the data set by transforming at least a portion of the received media data into frequency-domain data.

96. The system of Claim 95, wherein the data set forming means is operative to transform at least a portion of the received media data by producing amplitude data for each of a plurality of frequency ranges of the frequency-domain data, each frequency range corresponding to a predetermined code component.

97. The system of Claim 96, wherein the data set forming means is operative to form the amplitude data each as a ratio of amplitude data in a corresponding frequency range to a noise level based on amplitude data outside such corresponding frequency range.

98. The system of Claim 97, wherein the means for receiving media data comprises a portable device carryable on the person of a user.

99. The system of Claim 94, wherein the processor means is operative to decode the identification code by processing frequency-domain data.

100. The system of Claim 99, wherein the processor means is operative to process the frequency-domain data to decode components of the identification code at predetermined frequencies.

101. A system for measuring usage of media data representing information received at a user location, such media data not having been processed to decode an ancillary code, comprising:

a communications device at a processing facility located remotely from the user location having an input to receive a data set representing some, but not all, of the information represented by the media data; and

a processor located at the processing facility and coupled with the communications device to receive the data set and operative to process the data set to decode an ancillary code for the media data.

102. The system of Claim 101, wherein the processor is operative to decode the identification code by processing frequency-domain data.

103. The system of Claim 101, wherein the processor is operative to process the frequency-domain data to decode components of the identification code at predetermined frequencies.

104. A system for measuring usage of media data received at a user location, comprising:

a monitoring device at the user location and having an input to receive media data representing information;

a first processor at the user location coupled with the monitoring device to receive the media data and operative to form, without processing the media data sufficiently to decode an ancillary code, a data set representing some, but not all, of the information represented by the media data;

a first communications device coupled with the first processor to receive the data set and operative to communicate the data set to a processing system located remotely from the user location;

a second communications device at the processing system coupled with the first communications device to receive the data set; and

a second processor at the processing system and having an input coupled with the second communications device to receive the data set received by the second communications device, the second processor being operative to process the data set to decode an ancillary code for the media data.

105. The system of Claim 104, wherein the first processor is operative to form the data set by transforming at least a portion of the received media data into frequency-domain data.

106. The system of Claim 105, wherein the first processor is operative to form the data set by producing amplitude data for each of a plurality of frequency ranges of the frequency-domain data, each frequency range corresponding to a predetermined component of the identification code.

107. The system of Claim 106, wherein the first processor is operative to form each of the amplitude data as a ratio of amplitude data in a corresponding frequency range to a noise level based on amplitude data outside such corresponding frequency range.

108. The system of Claim 104, wherein the monitoring device comprises a portable monitoring device carryable on the person of a user.

109. The system of Claim 104, wherein the second processor is operative to decode the identification code by processing frequency-domain data.

110. The system of Claim 109, wherein the second processor is operative to process the frequency-domain data to decode components of the identification code at predetermined frequencies.

111. A method for measuring usage of media data received at a user location, the media data being reproducible as comprehensible images or comprehensible sounds, such media data not having been processed to decode an ancillary code, comprising:

receiving a data set at a processing system located remotely from the user location, the data set including data sufficient to decode ancillary codes if present in the media data, while excluding data required either to reproduce the comprehensible images or the comprehensible sounds; and

at the remotely located processing system, processing the data set to decode the ancillary codes if present in the data set.

112. The method according to Claim 111, further comprising:

receiving the media data in a monitoring device at the user location;

forming the data set in the monitoring device from the media data; and

communicating the data set from the user location to the remotely located processing system.

113. The method according to Claim 112, wherein forming the data set comprises transforming at least a portion of the received media data into frequency-domain data.

114. The method according to Claim 112, wherein the data set comprises data representing time-domain information.

115. The method according to Claim 114, wherein the time-domain data comprises data from a frequency range narrower than a frequency range of the media data.

116. The method according to Claim 112, wherein the data set comprises data representing phase information.

117. The method according to Claim 112, wherein the media data comprises audio data or video data.

118. The method according to Claim 112, wherein the media data is received as acoustic energy, electromagnetic energy, light energy, magnetic energy, or electrical energy.

119. The method according to Claim 112, wherein receiving media data comprises receiving media data in a portable monitoring device carryable on the person of a user.

120. A system for measuring usage of media data received at a user location, the media data being reproducible as comprehensible images or comprehensible sounds, such media data not having been processed to decode an ancillary code, comprising:

a processing system located remotely from the user location for receiving a data set, the data set including data sufficient to decode ancillary codes if present in the media data, while excluding data required to reproduce the comprehensible images or the comprehensible sounds;

the remotely located processing system operative to process the data set to decode the ancillary codes if present in the data set.

121. The system of Claim 120, further comprising:

a receiver operative to receive the media data at the user location;

a processor at the user location operative to form the data set from the media data; and

a communication device operative to communicate the data set from the user location to the remotely located processing system.

122. The system of Claim 121, wherein the processor is operative to transform at least a portion of the received media data into frequency-domain data.

123. The system of Claim 121, wherein the processor is operative to form the data set including data representing time-domain information therein.

124. The system of Claim 123, wherein the processor is operative to select the time-domain data from a frequency range narrower than a frequency range of the media data.

125. The system of Claim 121, wherein the processor is operative to form the data set including data representing phase information therein.

126. The system of Claim 121, wherein the receiver is operative to receive the media data as acoustic energy, electromagnetic energy, light energy, magnetic energy, or electrical energy.

127. The method of Claim 1, further comprising:

at the remotely located processing system, producing a signature characterizing the media data and matching the produced signature with a reference signature associated with identification data for the media data.

128. The system of Claim 22, wherein the second processor is further operative to produce a signature characterizing the media data and to match the produced signature with a reference signature associated with identification data for the media data.

129. The system of Claim 41, wherein the processor is further operative to produce a signature characterizing the media data and to match the produced signature with a reference signature associated with identification data for the media data.

130. The system of Claim 48, wherein the processing means is further operative to produce a signature characterizing the media data and to match the produced signature with a reference signature associated with identification data for the media data.

131. The system of Claim 67, wherein the processing means is further operative to produce a signature characterizing the media data and to match the produced signature with a reference signature associated with identification data for the media data.

132. The method of Claim 74, further comprising:

at the remotely located processing system, producing a signature characterizing the media data and matching the produced signature with a reference signature associated with identification data for the media data.

133. The method of Claim 81, further comprising:

at the processing system, producing a signature characterizing the media data and matching the produced signature with a reference signature associated with identification data for the media data.

134. The method of Claim 88, further comprising:

at the processing system, producing a signature characterizing the media data and matching the produced signature with a reference signature associated with identification data for the media data.

135. The system of Claim 91, wherein the processing means is further operative to produce a signature characterizing the media data and to match the produced signature with a reference signature associated with identification data for the media data.

136. The system of Claim 94, wherein the processing means is further operative to produce a signature characterizing the media data and to match the produced signature with a reference signature associated with identification data for the media data.

137. The system of Claim 101, wherein the processor is further operative to produce a signature characterizing the media data and to match the produced signature with a reference signature associated with identification data for the media data.

138. The system of Claim 104, wherein the second processor is further operative to produce a signature characterizing the media data and to match the produced signature with a reference signature associated with identification data for the media data.

139. The method of claim 111, further comprising:

at the remotely located processing system, producing a signature characterizing the media data and matching the produced signature with a reference signature associated with identification data for the media data.

140. The method of claim 139, wherein the signature is produced and matched with the reference signature when ancillary codes are not detected in the data set.

141. The system of Claim 120, wherein the remotely located processing system is further operative to produce a signature characterizing the media data and to match the produced signature with a reference signature associated with identification data for the media data.

142. The system of claim 141, wherein the signature is produced and matched with the reference signature when ancillary codes are not detected in the data set.

# EVIDENCE APPENDIX

EXHIBIT A: Final Office Action dated December 17, 2007.

EXHIBIT B: *Lu et al.* (U.S. Patent 6,647,548), cited by the Examiner in the Final Office Action dated December 17, 2007.

## RELATED PROCEEDINGS APPENDIX

None

## APPENDIX A

Final Office Action dated December 17, 2007

UNITED STATES PATENT AND TRADEMARK OFFICE

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/896,246 | 06/29/2001 | Ronald S. Kolessar | 25896.247/P0043A | 9192 |

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| EXAMINER | |
|---|---|
| NEWLIN, TIMOTHY R | |
| **ART UNIT** | **PAPER NUMBER** |
| 2623 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 12/17/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/896,246 | KOLESSAR, RONALD S. | |
| | Examiner | Art Unit | |
| | Timothy R. Newlin | 2623 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *23 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-142* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-23,26-49,52-82,85-95,99-105 and 108-142* is/are rejected.

7)☒ Claim(s) *3,4,24,25,50,51,83,84,96-98,106 and 107* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 8/23/2007 are clearly stated and have been fully considered, but they are not persuasive in overcoming the rejections applied in the previous action.

2. Applicant believes that the operations performed by Lu at the central office do not constitute "decoding" as the term is commonly understood in the art. However, the position of the Office is that at least two types of decoding take place at the central office.

3. The first decoding is the interpretation of the ancillary codes 96 in Fig. 4. Prior to this step, the tuning records 90 are transmitted to the central office. Block 124 receives these codes—which at this point are simply strings of letters with no logical relationship to the name of the program they identify—and transforms ("correlates") them into program names using a look-up table, program library 88. (Col. 13, 18-26; col. 11, line 61). This process fits a broad definition of "decoding" as commonly known in communications, for example definition #2 in the Encarta online dictionary entry provided by applicant.

4. The second type of decoding at the central office is not explicitly described but is inherent in the reference. At column 7, lines 1-5, Lu describes transmission of data over PSTN, from the subscriber site to the central office. As noted in the previous action, this telecommunication necessarily includes the formation of a data stream that can be sent

electronically via PSTN. This data stream is then received and decoded at the telecommunication processor 44 at the central office. Telecommunication processor 44 is performing a decoding operation.

5. A further argument made by the applicant is that the ancillary codes used in "sanity processing" are already decoded at a household metering apparatus and thus cannot be decoded at the central office. It is true that incoming video data is decoded by the television receiver at the subscriber site, but that does not preclude a different decoding step taking place at the central office.

6. For the above reasons, the limitations added by amendment to claims 1, 22, 41, 48, 67, 74, 81, 88, 91, 94, 101, 104, 111, and 120 are rejected under 35 USC §102.

### *Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 8 – 14, 21, 22, 26, 30 – 34, 41, 48, 55 – 59, 66, 67, 74, 81, 85, 88, 91, 94, 101, 104 and 108 are rejected under 35 U.S.C. 102(e) as being anticipated by Lu et al (US 6,647,548).

***Regarding claims 1, 22, 41, 48, 67, 74, 81, 88, 91, 94, 101, 104, 111, 112, 120 and 121,*** Lu discloses a coded/non-coded program audience measurement method and system which determines the program being viewed by detecting ancillary codes received. Lu discloses receiving a program broadcast signal (see col. 6 lines 51 – 58), which includes ancillary codes (see col. 7 lines 10 – 20) for displaying reproducible images on television 24 (see fig 1). The media data, which includes television programming, can also include ancillary codes, but that not all the received media data includes ancillary codes (see col. 8 lines 44 – 60).

Lu further discloses the program media is received at the monitoring site and ancillary data is extracted from the signal. Lu discloses "*The sensors 48 are arranged to acquire at least portions of the program signals corresponding to the programs or stations that household members select for viewing on the television 24. These portions of the program signals acquired by the sensors 48 are pre-processed, as desired, by the pre-processing circuit 50. The signal pre-processing circuit 50 supplies pre-processed program signals both to the ancillary code reader 52, which attempts to locate and read ancillary codes from the program signals*....". It is noted that Lu discloses a monitoring device with an input to receive the media data and a first processor coupled to the monitoring device for performing the above functions.

Lu still further discloses storing and transmitting the data to a central office for processing. Lu discloses "*The major function of the central office apparatus 32 is that of identifying viewed programs. For this purpose, the central office apparatus 32 retrieves*

*all of the tuning records 90 from all of the statistically selected households 12."* Lu further discloses "*A block 110 determines whether the tuning records 90 from the statistically selected households 12 include ancillary codes in the code field 96. If the tuning records 90 from the statistically selected households 12 include ancillary codes in the code field 96, the ancillary codes are subjected to sanity processing by a block 12.*" It is noted that Lu discloses the first communications device for sending the data set to the remote central office and a second communication device at the office for receiving the data set

Thus, Lu discloses forming a data set comprising extracted ancillary codes for transmission from the user site to the remote central office via a public switched telephone network 42 (see col. 7 lines 1 – 5). It is noted that a data set for transmission via a telephone network must inherently be formed.

It is further noted that the central office processes (by a second processor) the ancillary codes, thus the transmitted data is such to sufficiently decode the ancillary codes for processing to determine the correlation of ancillary codes with the program records stored (see col. 13 lines 17 – 25).

***As to claims 8, 9 and 117,*** Lu discloses the media data comprises audio and video data (see col. 6 lines 51 – 65).

***As to claims 10, 30 and 55*** Lu discloses a radio broadcast or audio cable transmissions for receiving the media data (see col. 6 lines 63 – 65) and thus discloses the claimed acoustic energy.

***As to claims 11,12, 31, 32, 56, 57, 118 and 126***, Lu discloses a fiber optic system for receiving the media data (see col. 6 lines 56 – 58) and thus discloses the claimed electromagnetic energy and light energy inherent to fiber optical communication systems.

***As to claims 13, 33 and 58*** Lu discloses detecting media from microphones and thus discloses magnetic energy (see col. 7 lines 32 – 55). It is noted that applicants disclose magnetic energy is associated with a speaker.

***Regarding claims 14, 34 and 59***, Lu discloses receiving media data signals via coaxial cable and thus discloses electrical energy inherent to coaxial cable systems (see col. 6 lines 55 – 57).

***Regarding claims 21, 26, 66, 85, 108 and 119***, Lu discloses receiving media data in a portable monitoring device carry able on the person of a user (see col. 6 lines 18 – 22, col. 9 line 48 – col. 10 line 9).

***Regarding claims 127-142***, Lu further discloses in an incorporated and commonly assigned reference (US 4,697,209) (column 3, lines 30-55, column 8, lines 33-35 and column 10, lines 51-58) that if ancillary codes are not detected in the data set, producing a signature characterizing the media data and matching the produced signature with a reference signature associated with identification data for the media data (column 3, lines 30-55).

## *Claim Rejections - 35 USC § 103*

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

8. Claims 2, 5- 7, 15 – 20, 27 – 29, 35 – 40, 42 – 47, 49, 52 – 54, 60 – 65, 68 – 73, 75 – 80, 82, 86, 87, 89, 90, 92, 93, 95, 99, 100, 102, 103, 105, 109 and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu (6,647,548).

***Regarding claims 20, 40, 47, 65, 73 and 80*** Lu discloses "...*it will be understood that program signals can be transmitted and/or distributed by a wide variety of means*..." (see col. 6 lines 55 – 60) but Lu fails to disclose detecting a spread spectrum code as the ancillary code.

Official Notice is taken it would have been well known to transmit media data via spread spectrum code to enable transmission over a wireless communication medium. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Lu to include the claimed limitation to provide communication over a wireless network.

***Regarding claims 2, 15, 23, 35, 42, 49, 60, 68, 75, 82, 86, 89, 92, 95, 99, 102, 105, 109, 113 and 122,*** Lu discloses transmitting a portion of the media data received to the central office by transmitting a data set via a public switched telephone network but fails to disclose transforming the data into frequency-domain data. Official Notice is taken that it would have been well known to frequency division multiplex data by transforming the data into frequency-domain data for the benefit of maximizing bandwidth efficiency. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Lu to include transforming, transmitting, receiving and processing the media data or ancillary codes in the frequency domain for the benefit of maximizing bandwidth efficiency.

***Regarding claims 5, 27, 52, 114 and 123,*** Lu discloses transmitting a portion of the media data received to the central office by transmitting a data set via a public switched telephone network but fails to disclose transforming the data into time domain information. Official Notice is taken that it would have been well known to time division multiplex by transforming the data into time domain data for the benefit of maximizing

bandwidth efficiency. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Lu to include transforming, transmitting, receiving and processing the media data or ancillary codes in the time domain for the benefit of maximizing bandwidth efficiency.

***As to claims 6, 28, 53, 115 and 124,*** Lu discloses the data set is a subset of the media data, and as discussed above, it would have been obvious to modify Lu to include transforming the data into the time domain. Necessarily, since the data set is smaller than the media data, it inherently has a frequency range narrower than that of the media data.

***Regarding claims 7, 29, 54, 116 and 125,*** Lu fails to disclose wherein the data set comprises data representing phase information.

Official Notice is hereby taken transmitting data as phase information would have been known to maximize transmission and / or bandwidth efficiency. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Lu to include the claimed limitation for the benefit of maximizing transmission and / or bandwidth efficiency.

***As to claims 16, 36, 43, 61, 69, 76, 87, 90, 93, 100, 103 and 110***, as discussed above, it would have been obvious to modify Lu to convert, transmit, receive and process data in the frequency domain. Necessarily, the frequency-domain data would have been processed to detect components of the ancillary codes at predetermined frequencies.

***Regarding claims 17, 37, 44, 62, 70 and 77*** fails to disclose wherein the frequency-domain data or ancillary data is distributed according to a frequency-hopping pattern. Official Notice it would have been well known to distribute data via a frequency-hopping pattern to provide a wireless communication system, which maximizes the efficiency of the available bandwidth. For example, in the telecommunications art, it would have been notoriously well known to transmit cellular telephonic data using a frequency hopping technique. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Lu to include the claimed frequency-hopping pattern for the benefit of having a wireless communication system, which maximizes the efficiency of the bandwidth available.

***Regarding claims 18, 19, 38, 39, 45, 46, 63, 64, 71, 72, 78 and 79*** fails to disclose wherein the code components comprise pairs of frequency components modified in amplitude to encode information and fails to disclose wherein the code components comprise pairs of frequency components modified in phase to encode information.

Official Notice is hereby taken it would have been well known modify pairs of frequency components in amplitude or phase to encode information for the benefit of maximizing transmission efficiency and/or bandwidth efficiency. Therefore, it would have been able to one having ordinary skill in the art at the time the invention was made to modify Lu to include modify pairs of frequency components in amplitude or phase to encode information for the benefit of maximizing transmission efficiency and/or bandwidth efficiency.

### *Allowable Subject Matter*

***Claims 3, 4, 24, 25, 50, 51, 83, 84, 96, 97, 98, 106, and 107*** objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### *Conclusion*

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy R. Newlin whose telephone number is (571) 270-3015. The examiner can normally be reached on M-F 9-6 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Kelley can be reached on (571) 272-7331. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CHRIS KELLEY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

## APPENDIX B

*Lu et al.* (U.S. Patent 6,647,548), cited by the Examiner in the Final Office Action dated December 17, 2007.

(12) **United States Patent**
**Lu et al.**

(10) **Patent No.: US 6,647,548 B1**
(45) **Date of Patent: Nov. 11, 2003**

(54) **CODED/NON-CODED PROGRAM AUDIENCE MEASUREMENT SYSTEM**

(75) Inventors: **Daozheng Lu**, Dunedin, FL (US); **David H. Harkness**, Wilton, CT (US)

(73) Assignee: **Nielsen Media Research, Inc.**, New York, NY (US)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **08/709,180**

(22) Filed: **Sep. 6, 1996**

(51) **Int. Cl.**[7] ..... **H04N 9/00**; H04N 7/16
(52) **U.S. Cl.** ..... **725/20**; 725/13
(58) **Field of Search** ..... 725/20, 19, 17, 725/14, 13, 12, 9, 10, 44, 45, 46, 1, 2, 4; H04N 9/00, 7/16, 7/10

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| | | |
|---|---|---|
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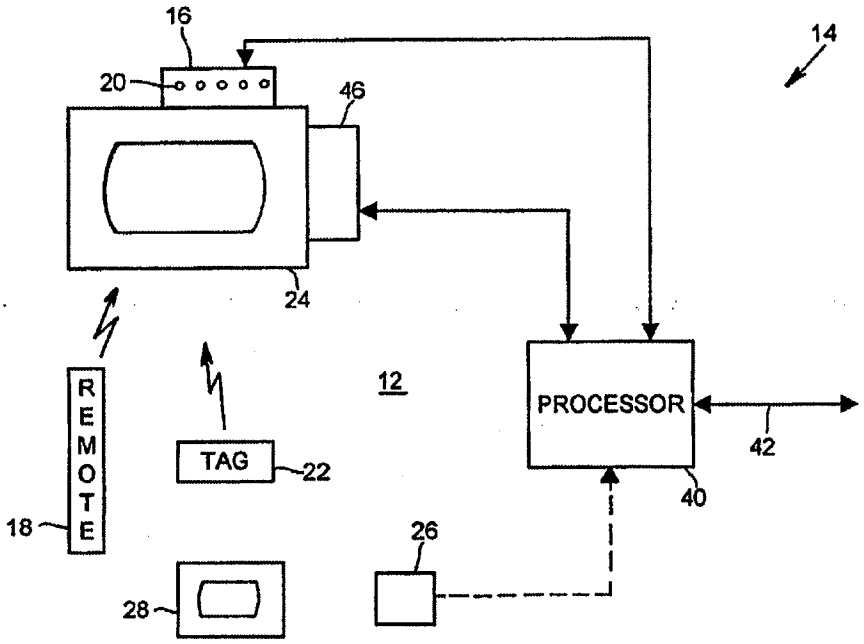
*Primary Examiner*—Vivek Srivastava
(74) *Attorney, Agent, or Firm*—Grossman & Flight, LLC

(57) **ABSTRACT**

An audience measurement system identifies a program which is broadcast from a signal source and to which a receiver is tuned. The audience measurement system includes a code reader for reading an ancillary code of the program to which the receiver is tuned, a channel status detector for determining channel status relating to channels to which the receiver is tuned, a memory for storing ancillary codes read by the code reading means and for storing channel status determined by the channel status determining means if ancillary codes are not readable by the code reading means, and a communicator for communicating the ancillary code and/or the channel status to a central office computer.

**37 Claims, 5 Drawing Sheets**



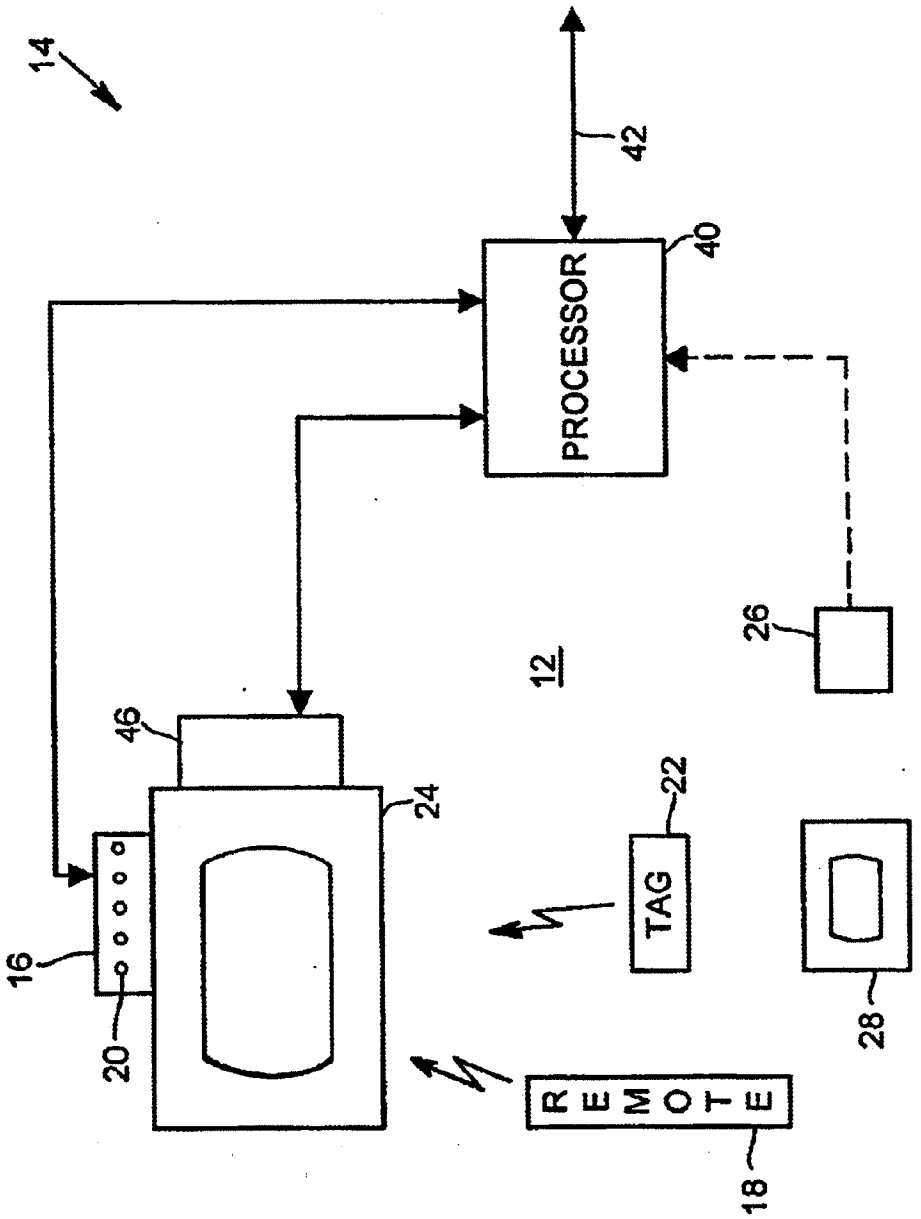



FIGURE 1

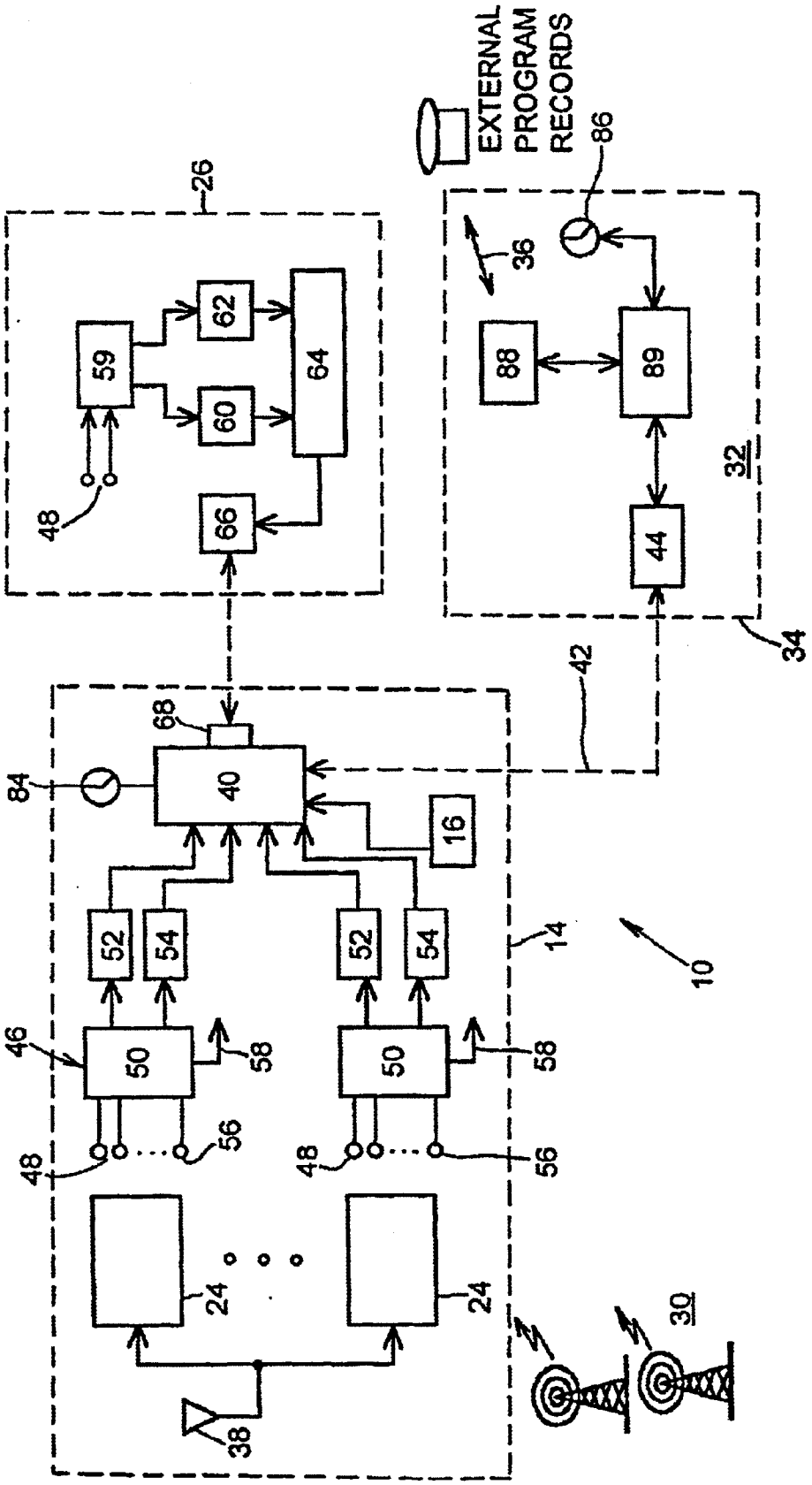

EXTERNAL PROGRAM RECORDS
86
26
36
62
64
59
60
66
48
88
89
32
44
34
42
68
84
40
16
52
54
52
54
14
10
46
50
58
50
58
48
56
48
56
24
24
30
38

FIGURE 2

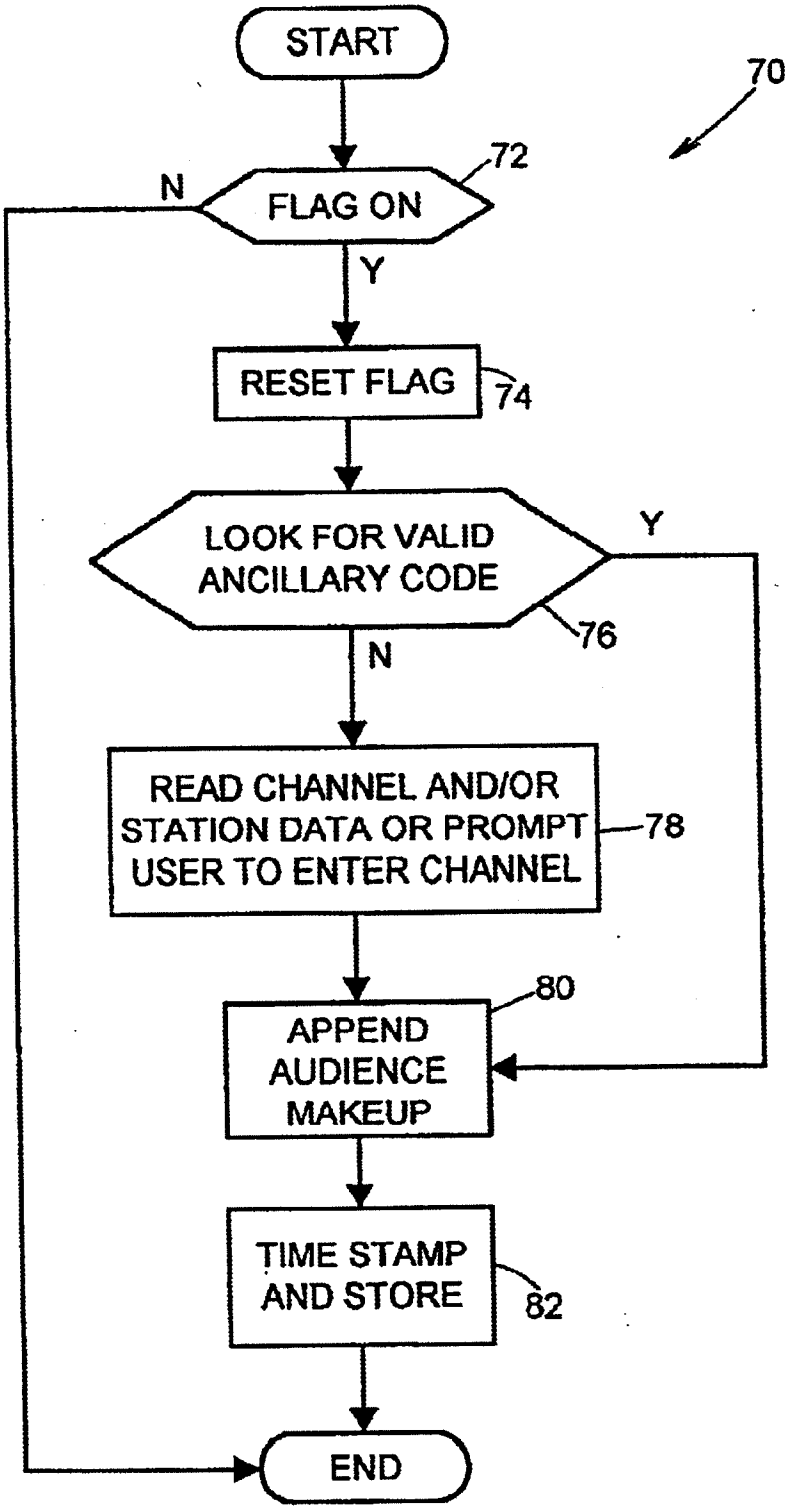

START
70
72
FLAG ON
N
Y
RESET FLAG
74
LOOK FOR VALID ANCILLARY CODE
Y
76
N
READ CHANNEL AND/OR STATION DATA OR PROMPT USER TO ENTER CHANNEL
78
80
APPEND AUDIENCE MAKEUP
TIME STAMP AND STORE
82
END

FIGURE 3

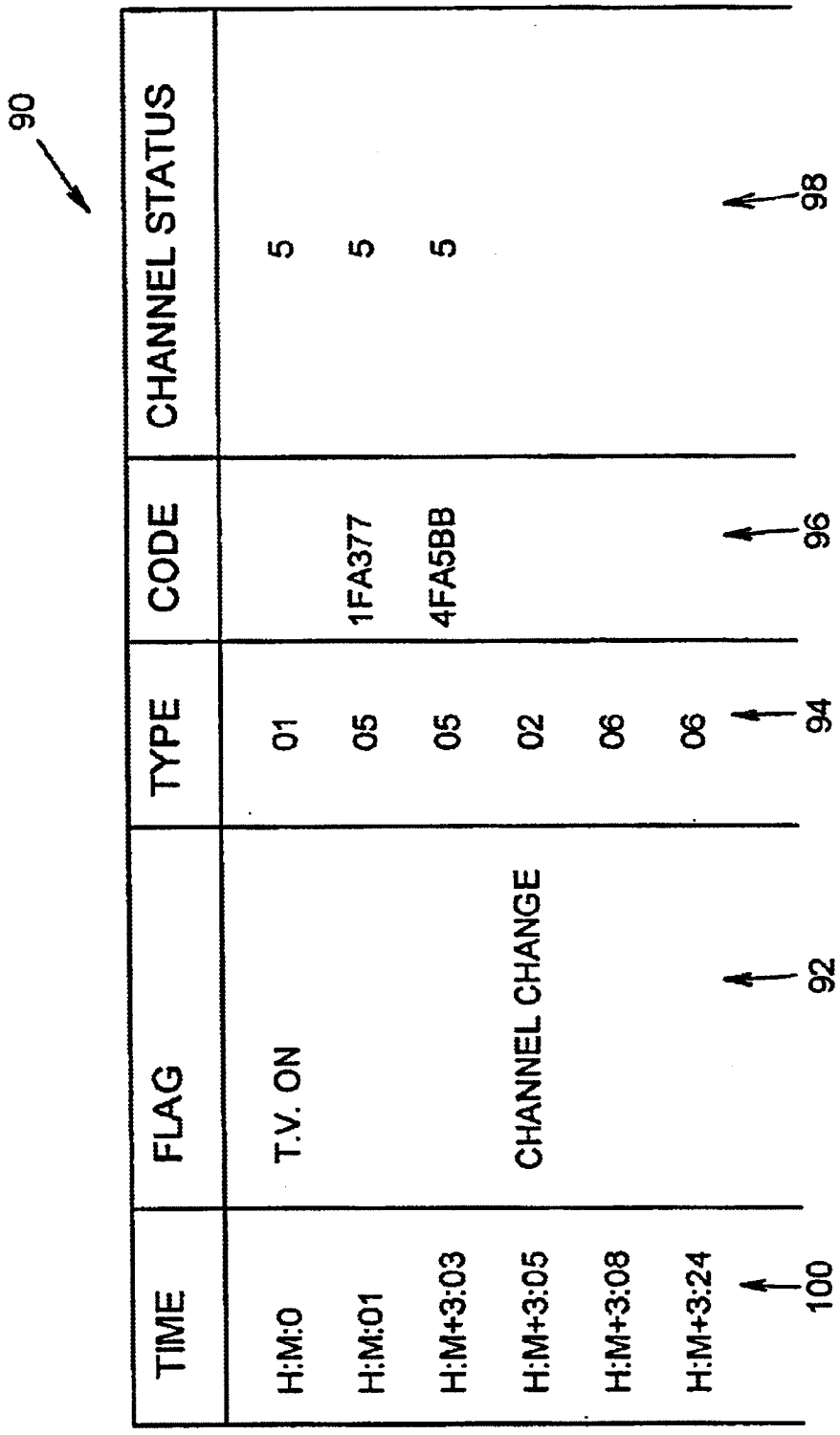

90
TIME
FLAG
TYPE
CODE
CHANNEL STATUS
H:M:0
T.V. ON
01
5
H:M:01
05
1FA377
5
H:M+3:03
05
4FA5BB
5
H:M+3:05
CHANNEL CHANGE
02
H:M+3:08
06
H:M+3:24
06
92
94
96
98
100

FIGURE 4

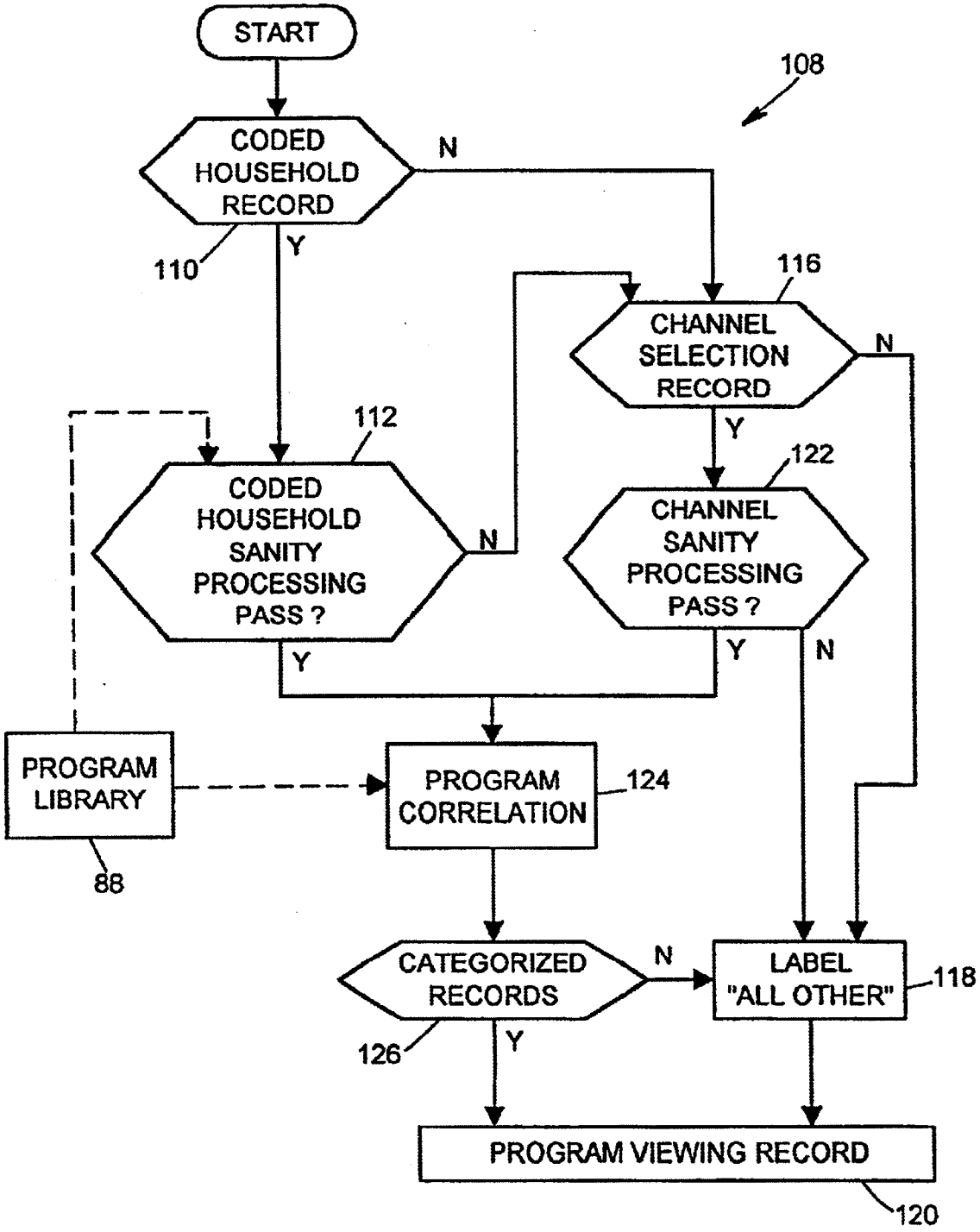

START
108
CODED HOUSEHOLD RECORD
N
Y
110
116
CHANNEL SELECTION RECORD
N
Y
112
CODED HOUSEHOLD SANITY PROCESSING PASS ?
N
Y
122
CHANNEL SANITY PROCESSING PASS ?
Y
N
PROGRAM LIBRARY
88
PROGRAM CORRELATION
124
CATEGORIZED RECORDS
N
Y
126
LABEL "ALL OTHER"
118
PROGRAM VIEWING RECORD
120

FIGURE 5

# CODED/NON-CODED PROGRAM AUDIENCE MEASUREMENT SYSTEM

## TECHNICAL FIELD OF THE INVENTION

The present invention relates to an audience measurement system and, more particularly, to a coded/non-coded program audience measurement system which identifies the programs or stations of televisions or radios which are watched, or listened to, by an audience.

## BACKGROUND OF THE INVENTION

Although the present invention is described herein with particular reference to television audience monitoring, it should be realized that the present invention applies also to the monitoring of other forms of audience entertainment, such as to the monitoring of radio audiences. Moreover, as used herein, the term "programs" means segments of various lengths such as all or parts of programs, commercials, promos, public service announcements, and so on.

Broadcast audience measurements have conventionally been made with equipment placed in statistically selected households to monitor the channels to which each receiver in the statistically selected households is tuned. Currently, data from such statistically selected households are collected at a central office and compared with separately collected reference data. This reference data includes a compiled list of those programs which are available on each receivable channel during each time period of interest, and are commonly referred to as program records. (Reference data may alternatively be referred to as station records, cable records, or the like.) By comparing the tuned channels, i.e. the channels to which the receivers in the statistically selected household were tuned, to the programs available on those channels at the time, an inference can be made as to the identities of the programs selected by the members of the household.

Conventional audience measurement equipment is expensive to install in a statistically selected household. A significant part of this expense is associated with the need to calibrate the tuned channels to the corresponding program sources (especially when the signals that come into the household are routed through a multitude of tuners, such as television tuners, cable converters, VCR tuners, and the like). Another significant part of this expense arises from the common need to open up (i.e., intrude into) monitored receivers and/or associated equipment so that the installer of the audience measurement equipment can secure access to the tuners of these receivers and/or associated equipment. Also, members of the statistically selected households may be reluctant to permit such intrusions for fear that the intrusions will cause damage or be unsightly.

Moreover, there is always at least some inherent confusion in the viewing records produced by an audience measurement system because, although the system accurately reports both the channels to which the receivers in a statistically selected household are tuned and the times during which those receivers are tuned to those channels, the programs currently being broadcast on those channels and at those times are not always accurately known. One suggested approach to avoiding this confusion is to label each broadcast program with an ancillary code (e.g., a digital code written on a selected video line in the vertical blanking interval of each video program to be broadcasted and/or monitored). This ancillary code can then be read by the metering equipment in the sampled households and can be compared (e.g., in a central office computer) to the ancillary codes stored in a code-program name library. The code-program name library contains a manually entered list of program names and the ancillary codes associated therewith. Thus, given an ancillary code of a program selected for viewing and/or listening in the sampled households, the program name of this program can be easily determined from the library. Such a system, however, has not been successfully employed in statistically selected households for audience measurement because it requires all possible programs to be encoded before a complete measurement can be made, and because it requires an ancillary code that can pass through a variety of distribution and broadcasting processes without being stripped or corrupted and thereby rendered illegible.



Therefore, instead of reading ancillary codes in statistically selected households in order to identify the programs to which receivers are tuned, ancillary codes are read in each market area in order to instead verify the program records. That is, the typical audience measurement system determines both the channels to which the receivers in the statistically selected households are tuned and the times that the receivers are tuned to those channels. The tuned channels, and the times during which those channels are tuned, are periodically transmitted to a central facility where the tuned channels, and the times during which those channels are tuned, are compared to the aforementioned program record. This program record is compiled from information supplied by the sources of these programs, and is intended to reflect the identity of the programs which are supposed to be aired at the times indicated in the program records. Current systems which read the ancillary codes of these programs are used simply to verify the accuracy of the program records, i.e. to verify that the programs were actually aired at the intended times and on the intended channels as indicated in the program records. Accordingly, even though not all programs are labelled with ancillary codes, some are. These ancillary codes are read in order to verify that at least those programs, which contain ancillary codes, were aired at the intended times and on the intended channels.

An example of such a system is disclosed by Haselwood, et al. in U.S. Pat. No. 4,025,851, which is assigned to the same assignee as the current application. The system disclosed therein monitors those programs which have an ancillary code written on a video line of one or more of a video program's vertical blanking intervals. The system described in this patent, which is generally referred to as the Automated Monitoring of Line-up (AMOL) system, has been in general use in the United States for over a decade, and is used to determine (i) the identity of aired programs, (ii) the local stations which air these programs, and (iii) the times during which these programs are aired. A system of this type significantly reduces the complexity, and improves the accuracy, of the resulting program records that are an essential element of current national television audience measurements. The AMOL system has not been used heretofore within statistically sampled households due to intrusive installations of metering equipment, code loss error problems, and lack of codes in some programs all of which can be more successfully remedied at a central monitoring site, but that are intractable in sampled households.

Other code monitoring systems include the radio audience monitoring system disclosed by Weinblatt in U.S. Pat. No. 4,718,106. Weinblatt teaches an audience measurement system in which each participant wears a metering device that includes a microphone and a detection circuit which

responds to in-band codes in the programming. Weinblatt discusses background noise as a problem in this method, and teaches that such noise is avoidable by using a microphone having a low sensitivity. The system disclosed in U.S. Pat. No. 4,807,031 utilizes a robust video luminance coding method with a low data rate. The system disclosed in U.S. Pat. No. 4,945,412 utilizes a sub-audible 40 Hz tone to encode the audio portion of a broadcast.

In U.S. patent application Ser. No. 07/981,199, (now U.S. Pat. No. 5,425,100), which is assigned to the same assignee as the current application, Thomas et al teach a multi-level encoding system in which an ancillary code may be inserted into a program at each level of distribution of the program. Each ancillary code identifies the source in its corresponding level of the multi-level encoding system. Thus, the program may be tracked through the distribution system.

As discussed above, systems which rely upon encoded broadcasts to identify programs require that all programs be encoded by at least one of the program sources (e.g., broadcasters) in the distribution system. Even in the unlikely event that all broadcasters were to agree to cooperate, occasional encoding equipment failures would likely cause gaps in the data provided by systems that rely solely on ancillary codes. These gaps would cause losses of rating data and would render all of the program share measurements meaningless whenever any significant number of programs are not encoded. Thus, there is a need to collect program identifying data even when there is no ancillary code present in the programs to be identified.

Furthermore, several broadcast measurement systems have been suggested which do not detect embedded ancillary codes in order to identify programs, but which instead monitor program content. These systems generally receive programs to be monitored at a measurement site, extract broadcast signatures from the programs, and compare these broadcast signatures with corresponding reference signatures which have been extracted from previous broadcasts of the programs to be monitored or from reference copies of these programs (e.g., distribution tapes) and which are stored in a reference library. For example, in U.S. Pat. No. 4,697,209, which is assigned to the same assignee as the current application, a program monitoring system is disclosed in which broadcast signatures are collected in sampled households relative to certain program content (e.g., a scene change in the video portion of a monitored program). These broadcast signatures are subsequently compared to reference signatures collected by reference equipment tuned to broadcast sources available in the selected market. A favorable comparison between broadcast signatures and corresponding reference signatures indicates the programs, not just the channels, being viewed. A similar program monitoring system is disclosed in U.S. Pat. No. 4,677,466, which is assigned to the same assignee as the current application and which logs the broadcasts of selected programs (e.g., commercial advertisements).

There are several problems with monitoring equipment which uses extracted signatures in order to identify programs. For example, in order for monitoring equipment to extract useful signatures which can be successfully correlated, the monitoring equipment is necessarily complex if there are too many programs or stations (e.g., more than several hundred) to be monitored. Additionally, such systems rely on reference measurement sites that collect reference signatures from known program sources. When one set of reference equipment fails, all reference signature data for that program source may be lost. Therefore, a redundant backup reference system must be installed. Such systems then become computationally expensive, and their use has been restricted by the cost of computer hardware. Also, in those systems which extract broadcast signatures at a monitoring site and transmit the broadcast signatures to the reference site for correlation with the reference signatures, substantial resources are required in order to process and communicate the broadcast signatures, to transmit these signatures to the reference site, and to compare theses signatures with valid reference signatures. Furthermore, matching signatures must be further processed and compared with program records.

The present invention overcomes one or more of the problems associated with prior art audience measurement systems.

## SUMMARY OF THE INVENTION

Therefore, in accordance with one aspect of the present invention, an audience measurement system identifies a program which is transmitted from a signal source and to which a receiver is tuned. The audience measurement system includes code reading means, channel status determining means, and identifying means. The code reading means reads an ancillary code of the program to which the receiver is tuned. The channel status determining means determines channel status relating to channels to which the receiver is tuned. The identifying means identifies the program from at least one of the ancillary code and the channel status.

In another aspect of the present invention, an audience measurement system includes code reading means, channel status determining means, and storing means. The code reading means reads an ancillary code of a program to which a receiver is tuned. The channel status determining means determines channel status relating to channels to which the receiver is tuned. The storing means stores the ancillary code read by the code reading means if the ancillary code is readable by the code reading means and stores channel status determined by the channel status determining means if the ancillary code is not readable by the code reading means.

In still another aspect of the present invention, an audience measurement system includes code reading means, channel status determining means, and communicating means. The code reading means reads an ancillary code of a program to which a receiver is tuned. The channel status determining means determines channel status relating to channels to which the receiver is tuned. The communicating means communicates ancillary codes read by the code reading means to a remote site and communicates channel status determined by the channel status determining means to the remote site if ancillary codes are not readable by the code reading means.

In a further aspect of the present invention, a method of identifying programs received by a receiver includes the steps of a) detecting, at the receiver, a signal corresponding to the programs, b) reading ancillary codes if the ancillary codes are present in the signal and are readable, c) determining channel status relating to channels to which the receiver has been tuned, d) forwarding the ancillary codes and the channel status to a central office, e) if the ancillary codes were read, comparing, in the central office, the ancillary codes with a library to thereby identify the programs, and f) if the ancillary codes were not read, comparing, in the central office, the channel status with a library to thereby identify the programs.

In yet a further aspect of the present invention, a method of measuring audiences in statistically selected households

includes the steps of a) in each statistically selected household, detecting signals corresponding to programs, b) in each statistically selected household, reading ancillary codes when the ancillary codes are present in the signals, and c) in each statistically selected household, determining channel status information relating to channels to which receivers are tuned when ancillary codes are not present in the signals.

In still a further aspect of the present invention, a method of identifying programs to which a receiver is tuned comprises the steps of a) detecting signals corresponding to the programs, b) reading ancillary codes when the ancillary codes are readable in the signals, c) determining channel status information relating to channels to which the receivers are tuned, d) identifying the programs from the ancillary codes if the ancillary codes are readable, and e) identifying the programs from the channel status information if the ancillary codes are not readable.

## BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and advantages will become more apparent from a detailed consideration of the invention when taken in conjunction with the drawing in which:

FIGS. **1** and **2** schematically illustrate an example coded/non-coded audience measurement system;

FIG. **3** is a flow chart of the operations performed by the household metering apparatus of the coded/non-coded audience measurement system shown in FIGS. **1** and **2**;

FIG. **4** is a tabular example of tuning records stored by the household metering apparatus of the coded/non-coded audience measurement system shown in FIGS. **1** and **2**; and,

FIG. **5** is a flow chart of the program recognition performed by a central office of the coded/non-coded audience measurement system shown in FIGS. **1** and **2**.

## DETAILED DESCRIPTION

### Measurement System Overview

As shown in FIGS. **1** and **2**, a coded/non-coded audience measurement system **10** measures the viewing habits of the members of a statistically selected household **12**. The coded/non-coded audience measurement system **10** includes a household metering apparatus **14** located in the statistically selected household **12**. The household metering apparatus **14** may include an audience composition determination device **16**, which is referred to hereinafter as a people meter.

The people meter **16** allows audience members to indicate their presence by means of a remote control **18** and/or a plurality of pushbutton switches **20**. The existing remote control which the members of the statistically selected household **12** used prior to installation of the coded/non-coded audience measurement system **10** may be used for the remote control **18**. The remote control **18** may instead be provided as part of the household metering apparatus **14**. Ideally, in order to minimize changes in the statistically selected household **12**, the household metering apparatus **14** should be configured to use the existing remote controls. Alternatively, or additionally, a personal tag **22** may be worn by a viewer and may periodically broadcast an identifying message to the people meter **16**. Each viewer in the household may have a personal tag **22** which emits an identifying message exclusively identifying the viewer. Instead of, or in addition to, being arranged to respond to the remote control **18**, to the pushbutton switches **20**, and/or to the personal tag **22**, the people meter **16** may be arranged to include an image sensing device and a computer image processing system (not shown) in order to passively identify the viewers in a viewing audience without requiring the active participation of the viewers to be identified. Examples of such system are disclosed by Lu in U.S. Pat. No. 4,858,000 and U.S. Pat. No. 5,031,228 and by Lu et al. in allowed U.S. patent application Ser. No. 07/992,383 filed on Dec. 15, 1992, now U.S. Pat. No. 5,550,928.

Accordingly, the people meter **16** identifies each viewing member of the viewing audience. It is desirable, but not essential, that the people meter **16** be located in the vicinity of a television to be metered. One such television receiver **24** is shown in FIG. **1**.

Although many audience measurements are restricted to a determination of viewing activity at the television receiver **24** within the statistically selected household **12**, it is desirable to also measure viewing and tuning that may be done outside of the statistically selected household **12**. For this purpose, a portable metering apparatus **26** is provided. The portable metering apparatus **26** may be worn or carried by a viewer of the statistically selected household **12** when, for example, the viewer is away from the statistically selected household **12**. In accordance with the present invention, the portable metering apparatus **26** is capable of automatically or manually determining the programs, channels, and/or stations to which a television in the vicinity of the portable metering apparatus **26** is tuned. The portable metering apparatus **26** may be carried by the person whose viewing habits are being metered, in which case the portable metering apparatus **26** is a portable personal metering apparatus, and/or the portable metering apparatus **26** may be portable in order to meter viewing habits in conjunction with a portable television or the like. Thus, in this latter case, the portable metering apparatus **26** may be used in conjunction with a portable television **28**.

As shown in FIG. **2**, the coded/non-coded audience measurement system **10** generally includes the household metering apparatus **14**, which is installed in each of a plurality of statistically selected households, such as the statistically selected household **12**, and which receives signals from one or more program signal sources **30**.

The coded/non-coded audience measurement system **10** further includes a central office apparatus **32** which is installed at a central site **34** and which collects data from the household metering apparatus **14** and from external program records sources as indicated by an arrow **36**. The central office apparatus **32** processes the data collected from the household metering apparatus **14** and/or from the external program records sources to produce audience measurement reports.

Although FIG. **2** schematically depicts the program signal sources **30** as being broadcast transmission antennas which transmit program signals that are received by an antenna **38** in the statistically selected household **12**, it will be understood that program signals can be transmitted and/or distributed by a wide variety of means such as by coaxial cables, fiber optic cables, satellites, rented tapes, disks, and so on. Moreover, although FIG. **2** shows encoded and non-encoded television program signals being distributed to a plurality of television receivers **24** in a statistically selected household **12**, it will become clear in the following discussion that the present invention is equally applicable to encoded radio signals or to any other encoded video and/or audio sources, such as radio broadcasts, audio cable transmissions, tape cassettes and so on.

The household metering apparatus **14** of the coded/non-coded audience measurement system **10** preferably includes

a data storage and telecommunication processor **40** that communicates, via a public switched telephone network **42**, with a telecommunication processor **44** of the central office apparatus **32**. The household metering apparatus **14** also includes tuning measurement equipment **46** for each of the television receivers **24**. Each tuning measurement equipment **46** includes one or more sensors **48**, a signal pre-processing circuit **50**, a household ancillary code reader **52**, and a household channel and/or station detector **54**.

Any of a variety of sensors may be used for the sensors **48**. The function of the sensors **48** is to detect coded transmissions from the program sources **30** and to detect channel and/or station selections from the remote control **18**. For example, the sensors **48** may be, inter alia, a physical connection to the video circuits of the television receiver **24** for ancillary code detection and a physical connection to the infra-red sensor of the television receiver **24** for channel and/or station selection detection. The preferred sensors for the sensors **48**, however, are non-intrusive sensors such as microphones for ancillary code detection and separate infra-red sensors responsive to the remote control **18** for channel and/or station selection detection. Microphones and infra-red sensors, which can be installed in the immediate vicinity of the television receiver **24** so as to pick up the sounds emanating from the speakers of the television receiver **24** and infra-red signals from the remote control **18**, offer an installation which is non-intrusive. Because the installation is non-intrusive, the television receivers **24** need not be opened up in order to electrically connect the sensors **48** thereto. Objections which might otherwise be raised are thereby avoided.

Since microphones used as the sensors **48** will also pick up other sounds in the area, noise canceling microphones may be used therefor or additional microphones **56** may be installed so that they pick up relatively more of the background noise and relatively less of the sounds from the speakers of the television receivers **24**. The output signal from the additional microphone **56** is used by the signal pre-processing circuit **50** to at least partially delete background noise from the output signals of the microphones of the sensors **48** by matching the amplitudes of the output signals from the microphones of the sensors **48** and from the additional microphone **56**, and by then either subtracting the output signals of the microphones of the sensors **48** from the output signal of the additional microphone **56** or subtracting the output signal of the additional microphone **56** from the output signals of the microphones of the sensors **48**. Alternatively, the signal pre-processing circuit **50** may employ other audio signal processing methods to reduce background noise. For example, the signal pre-processing circuit **50** may employ input filters that can, for example, pass only those audio signals in a 300 Hz–3000 Hz passband in order to eliminate traffic noise and to remove artifacts introduced by the response characteristics of the household's appliances and equipment.

Other examples of non-intrusive sensors which can be used for the sensors **48** include inductive audio pickups operatively associated with the audio output circuitry of the metered televisions **24**, video cameras located near the screen of the television receiver **24** to collect video images thereon, or photosensors located adjacent to the screen of the metered televisions **24** to measure overall changes in screen luminance as a function of time, or a combination of the above.

The sensors **48** are arranged to acquire at least portions of the program signals corresponding to the programs or stations that household members select for viewing on the televisions **24**. These portions of the program signals acquired by the sensors **48** are pre-processed, as desired, by the pre-processing circuit **50**. The signal pre-processing circuit **50** supplies pre-processed program signals both to the household ancillary code reader **52**, which attempts to locate and read ancillary codes from the program signals corresponding to the programs or stations selected by one or more viewers in the statistically selected household **12**, and to the household channel and/or station detector **54**, which generates channel and/or station selection information from the program selections made by one or more viewers using the remote control **18**.

The household ancillary code reader **52** may be of a type similar to that disclosed by Haselwood, et al. in U.S. Pat. No. 4,025,851, the disclosure of which is incorporated herein by reference, or U.S. Pat. Nos. 5,425,100 and 5,526,427 by Thomas et al. An ancillary code, as disclosed by Haselwood, et al. in U.S. Pat. No. 4,025,851, is inserted into the program video and is read by the disclosed apparatus. Although video encoding is more widely used as a means of tracking television broadcasts than is audio encoding, video encoding is less amenable to detection by not-intrusive sensors. Thus, if any one or more of the sensors **48** are microphones, the ancillary code must be placed in audio and may be read by apparatus similar to the video code reading apparatus disclosed by Haselwood, et al. in U.S. Pat. No. 4,025,851 or by apparatus similar to the audio code reading apparatus disclosed by Weinblatt in U. S. Pat. No. 4,718,106. It will be clear to those skilled in the art, however, that essentially the same benefits are available if the video codes taught by Haselwood, et al. in U.S. Pat. No. 4,025,851 or by Thomas, et al. in U.S. Pat. Nos. 5,425,100 and 5,526,427 are used. The household channel and/or station detector **54** may be the type disclosed in U.S. Pat. No. 4,697,209 by Kiewit, et al and by Zurlinden in U.S. Pat. No. 4,972,503.

The ancillary code may have any form as long as the program, channel and/or station associated therewith is uniquely identified by the ancillary code. Also, as taught in U.S. Pat. Nos. 5,425,100 and 5,526,427 by Thomas et al, the ancillary code may comprise a plurality of segments each containing unique source information so that the information in each segment is representative of a selected one of a plurality of levels of distribution of the associated program.

Since an ancillary code can carry with it all the information necessary for identifying a broadcast transmission, and since code readers are well-known, a coded/non-coded audience measurement system that uses encoded program transmission is economically very attractive. Moreover, code readers for reading ancillary codes can be provided with appropriate checking algorithms and the like so that the number of failures to accurately read the ancillary code (such as the multi-level ancillary code described by Thomas et al in U.S. Pat. Nos. 5,425,100 and 5,526,427) can be made arbitrarily low.

The problem with a system that relies exclusively on ancillary codes, as noted earlier herein, is that not all programs, channels, and/or stations are provided with useable ancillary codes. Thus, it is advantageous to also include the household channel and/or station detector **54** to identify selected channels and/or stations. The selections of channels and/or stations by the members of the statistically selected household **12** may be used when ancillary codes are not included in the programs being viewed. Accordingly, the household channel and/or station detector **54** is also included in the household metering apparatus **14** in addition to the household ancillary code reader **52** so that the selections of channels and/or stations by the members of the statistically

selected household **12** can be determined and collected when ancillary codes cannot be read.

When a member of the statistically selected household **12** takes a control action by use of the remote control **18**, the signals emanating from the remote control **18** are received by both the television receiver **24** and appropriate ones of the sensors **48** of the tuning measurement equipment **46**. Therefore, if the household ancillary code reader **52** is unable to locate and/or read valid ancillary codes from the program signals corresponding to the programs or stations selected by one or more members in the statistically selected household **12**, channels and/or stations detected by the household channel and/or station detector **54** may be used instead to provide the information relating to the viewing habits of the members of the statistically selected household **12**. Systems for detecting channels and/or stations are described by Kiewit in U.S. Pat. No. 4,876,736 and by Zurlinden in U.S. Pat. No. 4,972,503.

Additionally, or alternatively, if the household ancillary code reader **52** is unable to locate and/or read valid ancillary codes from the program signals corresponding to the programs or stations selected by one or more members in the statistically selected household **12**, the tuning measurement equipment **46** may be arranged to prompt such members to enter the selected channel and/or station by use of an input device such as the remote control **18**, the pushbutton switches **20** of the people meter **16**, a voice recognition sensor, and so on. The prompt may be provided by the television receiver **24** through the use of on-screen information or by a transducer **58**. The transducer **58** may be of the type which provides an audio signal, a synthesized voice message from a speaker, a visual display, or a flash from an LED, a CRT, or an LCD, or the like. The prompted information may be received by an appropriate one of the sensors **48** or by the additional microphone **56** and is stored for eventual transmission to the central office apparatus **32**.

The data storage and telecommunication processor **40** selectively stores the ancillary codes that have been read by the household ancillary code reader **52** and/or the channel and/or station information provided by the household channel and/or station detector **54**. It should be noted that in the event that a partially legible ancillary code is read by the household ancillary code reader **52**, the data storage and telecommunication processor **40** may also store the code fragment (e.g., one field of a multi-level ancillary code) for use by the coded/non-coded audience measurement system **10**.

The portable metering apparatus **26** may be used to gather ancillary codes or channel and/or station selection information either in the statistically selected household **12** or at other locations where the members of the statistically selected household **12** may encounter media. These locations include, for example, other households, movie theaters, automobiles, and so on.

The portable metering apparatus **26** may be similar to the household metering apparatus **14** and may also have one or more sensors **48**, a signal pre-processing circuit **59** which may be similar to the signal pre-processing circuit **50**, an ancillary code reader **60** which may be similar to the household ancillary code reader **52**, and a channel and/or station detector **62** which may be similar to the household channel and/or station detector **54**. The data that the portable metering apparatus **26** generates is temporarily stored in a random access memory **64** so that it may be occasionally transferred to the data storage and telecommunication processor **40** by way of an interface circuit **66**, such as a first modem, and a corresponding interface circuit **68**, such as a second modem, associated with the data storage and telecommunication processor **40**. The portable metering apparatus **26** may further include a rechargeable battery for supplying power to its sensors **48**, its signal pre-processing circuit **59**, the ancillary code reader **60**, the channel and/or station detector **62**, the random access memory **64** and the interface circuit **66**.

As is known in the art, data may be transmitted between the interface circuits **66** and **68** by direct electrical connections, radio frequency transmissions, pulsed infrared signalling, etc. The transfer of data by the portable metering apparatus **26** to the data storage and telecommunication processor **40** can be operationally accomplished during recharging of the battery of the portable metering apparatus **26** by placing the portable metering apparatus **26** in a physical cradle which supports the recharging of the battery and data link communications with the data storage and telecommunication processor **40**.

The sensors **48** of the portable metering apparatus **26** may be the same or different than the sensors **48** of the household metering apparatus **14** and may include a keyboard in order to allow the user to directly enter the program being received in the absence of ancillary codes. In addition, the sensors **48** of the portable metering apparatus **26** may include a vibration transducer such as the transducer **58** in order to prompt the user to enter channel and/or station selections in the absence of ancillary codes.

The central site **34**, which collects data from all of the statistically selected households **12**, is indicated in FIG. **2** as being at a single location. Although this centralized single location for the collection of data may be advantageous in connection with the compilation of a single national television audience measurement from the different broadcasts in different cities, it should be clear that the central site **34** can alternatively be located at a site in each of the market areas being monitored. When portions of the systems are dispersed at a number of different locations, it is common practice to composite partially processed data from each site at a single central office and to issue the reportable data from that central location.

## In-Household Measurements

The detection of ancillary codes, channel and/or station selections, and audience makeup by the tuning measurement equipment **46** and the people meter **16** may be performed by a routine **70** shown in FIG. **3**. This routine **70** may be performed by a processor in the data storage and telecommunication processor **40**.

At the beginning of the routine **70**, a block **72** determines whether tuning data is needed. As discussed in U.S. Pat. No. 4,697,209, a logical flag may be set when either a television is turned on or the channel to which the television receiver is currently tuned is changed. As noted in U.S. Pat. No. 4,697,209, a loss of video synchronization may be used to set the flag to indicate a channel change if the television **24** is being metered by use of its video signal. On the other hand, if the television **24** is being metered by use of its audio signal (such as where a non-intrusive audio sensor is used), a sudden change in the audio may be used to set the flag to indicate a channel change. Alternatively, either the horizontal flyback 15 KHz "sound" or the average sound/picture level from the television **24** may be monitored to determine a change in the on/off status of the television **24**.

When the flag is set, the block **72** determines that it is time to capture data. It should be noted that if no such flagging

event occurs within some predetermined time-out period, and if the television **24** is on, the flag is set anyway in order to ensure that a predetermined minimum number of ancillary codes, channel and/or station selection data, and audience makeup data will be captured during any given time period.

If the block **72** determines that the flag is not set, the routine **70** is ended and is reentered after a predetermined amount of time. This operation avoids unnecessary monitoring of televisions and/or radios which are off. If the block **72** determines that the flag is set, a block **74** resets the flag, and a block **76** reads an ancillary code in the signal received by an appropriate sensor **48** and located and read by the household ancillary code reader **52**, if such an ancillary code is present in this signal. If such an ancillary code is not present or is not capable of being read, a block **78** then reads the channel and/or station selection information generated by the household channel and/or station detector **54**. Alternatively, if an ancillary code is not present or capable of being read, the block **78** may instead prompt the user to manually enter the viewed channel and/or station by using the remote control **18**, the pushbutton switches **20** of the people meter **16**, a voice recognition sensor, the keyboard of the sensors **48** of the portable metering apparatus **26**, etc. The block **78** then reads the prompted channel and/or station selection information manually entered by the user. A block **80** attaches the audience makeup data from the people meter **16** to either the detected and valid ancillary code or to the channel and/or station selection data, as appropriate.

A block **82**, by use of a clock such as a time-of-day clock **84** at the statistically selected household **12** (FIG. **2**), adds a time stamp to the ancillary code read by the block **76** and to the audience makeup attached by the block **80** or adds a time stamp to the channel and/or station selection data read by the block **78** and the audience makeup data attached by the block **80**, as appropriate. The block **82** also stores the time stamped information.

One of the timing methods which may be used by the block **82** includes the use of clock signals from the time-of-day clock **84** which may be synchronized to a time zone such as the eastern standard time zone. This method involving the use of time-of-day clock time is most appropriate in the measurement of real-time audiences, i.e. measurements that, usually in the interest of economy, ignore time-shifted viewing of programs recorded in the home and time-independent viewing of rental tapes.

This clock signal timing method generally requires that the time-of-day clock **84** at the statistically selected household **12** and a clock **86** at the central site **34** of the coded/non-coded audience measurement system **10** be synchronized to much less than the minimum reported viewing interval (which, for example, may be as short as one second, or as long as one minute). It has been common commercial practice for more than a decade to provide synchronization between clocks in an audience measurement system so as to maintain an accuracy of about one second at any instant during the day following synchronization. The expectation value of this one second drift error is limited by thermal considerations. It is well known that this one second variance can be reduced to about 0.1 second per day by controlling the temperatures of the various clocks **84** and **86**.

A program library **88** at the central site **34** of the coded/non-coded audience measurement system **10** stores program records which correlate ancillary codes and channel status information to programs IDs which identify the programs to which receivers may be tuned. The program library **88** is used by a processor **89** of the central office apparatus **32** in a manner to be discussed hereinafter.

The data available from the household metering apparatus **14** of the coded/non-coded audience measurement system **10** generally comprises a chronologically ordered set of tuning records **90** shown in FIG. **4**, where a tuning record consists of a flag field **92**, a type field **94** (e.g., to characterize the ancillary code or channel status as having been read in response to different types of conditions, such as absolute timing, a channel change, a television on/off change, and/or the like), a code field **96**, a channel status field **98** which contains the selected channel, and a time data field **100** containing the time at which (i) the corresponding ancillary code was detected, or (ii) the corresponding channel was selected, or (iii) the corresponding flag was set. The specific example shown in FIG. **4** could be generated by turning a television receiver on at a time H:M:0 and viewing an encoded program until time H:M+3:03, at which time a new program appeared on that channel and the viewer retuned (at time H:M+3:05) to a different channel and/or station carrying a program that did not have a legible ancillary code associated therewith.

## Central Office Operations

The central office apparatus **32** collects data from a plurality of statistically selected households **12**. As will be apparent from the following discussion, the central office functions may be done at a single location as shown. However, for a small, simple system, the central office functions may be performed at a household site. Alternatively, for a large system (e.g., one that involves both local and national measurements), there may be a hierarchy of central offices in which some of the functions (e.g., identification of real time viewing) are done locally at each of a plurality of local central offices, while other functions (e.g., identification of viewing of rented video tapes) may be done at a single master central office.

The major function of the central office apparatus **32** is that of identifying viewed programs. For this process, the central office apparatus **32** retrieves all of the tuning records **90** from all of the statistically selected households **12**. These records are processed by the processor **89** in accordance with a routine **108** which is shown in FIG. **5**.

A block **110** determines whether the tuning records **90** from the statistically selected households **12** include ancillary codes in the code field **96**. If the tuning records **90** from the statistically selected households **12** include ancillary codes in the code field **96**, the ancillary codes are subjected to sanity processing by a block **112**. For example, those ancillary codes that are outside of the possible range for ancillary codes, those ancillary codes that vary too quickly over a selected time interval, and those ancillary codes that are not valid for the specified time stamp are not passed by the block **112**. The sanity processing performed by the block **112** is based upon ancillary code information which is stored in the program library **88**.

If the tuning records **90** from the statistically selected households **12** do not include ancillary codes in the code field **96**, or if the tuning records **90** from the statistically selected households **12** include ancillary codes in the code field **96** but the ancillary codes do not pass the sanity processing performed by the block **112**, the tuning records are passed to a block **116** for channel selection record processing. If the block **116** determines that the records contain no channel selection records, the tuning record is labelled by a block **118** as "All Other" and a block **120** stores this labelled tuning record.

If the block **116** determines that the tuning records contain channel selection records, a block **122** performs channel

status sanity processing on such tuning records. This channel status sanity processing may include, for example, determination of whether the channel status in a tuning record is in a possible range of channels, whether a flag has been set indicating that a channel status resulted from a very fast channel change (indicating channel surfing), and whether a flag has been set indicating that a channel status resulted from a very slow channel change (which may be set, for example, as a result of issuing a prompt to which no one responds indicating that the monitored television is not being watched). If the channel status in a tuning record does not pass the sanity processing performed by the block **122**, the tuning record is labelled by the block **118** as "All Other" and the block **120** stores this labelled tuning record.

The ancillary codes which pass the sanity processing performed the block **112**, and the tuning records which pass the sanity processing performed by the block **122**, are processed by a block **124**. The block **124** correlates the ancillary codes and channel status information with the program records stored in the program library **88** in order to identify the programs to which the television **24** was tuned since the last collection of data by the central office apparatus **32** from the tuning measurement equipment **46**. That is, for those tuning records **90** which include ancillary codes, the programs IDs associated with the ancillary codes are obtained from the program-code library **88**. On the other hand, for those tuning records **90** which do not include readable ancillary codes but which do include channel status information, the programs IDs associated with the channels contained in the channel status information are obtained from the program-code library **88**. These program IDs identify the programs covered by the tuning records **90** which pass the block **112** or the block **122**. The block **124** also determines whether the programs identified by the ancillary codes and by the channel status occurred in the correct time slots and in the correct geographic location as indicated by the program records stored in the program library **88**.

A block **126** then tests the results of the processing by the block **124**. If the programs identified by the ancillary codes and the channel status occurred in the correct time slots and in the correct geographic location as indicated by the program records stored in the program library **88**, the block **120** stores these tuning records and program IDs. On the other hand, if the programs identified by the ancillary codes and the channel status did not occur in the correct time slots and in the correct geographic location as indicated by the program records stored in the program library **88**, the block **118** labels the corresponding records as "All Other" and a block **120** stores these labelled tuning records.

Although the present invention has been described with respect to several preferred embodiments, many modifications and alterations have been described and still other modifications and alterations can be made without departing from the scope of the present invention. For example, the present invention can be used to identify either the programs or the stations being viewed or listened to by an audience. Therefore, as used herein, the term "programs", in addition to meaning segments of various lengths such as all or parts of programs, commercials, promos, public service announcements, and so on, can also mean stations being viewed or listened to by an audience. Also, although the manually operated devices on the people meter **16** which allow audience members to indicate their presence have been described as a plurality of pushbutton switches **20**, it should be appreciated that the these manually operated devices could be levers, knobs, voice recognition devices, or the like. Furthermore, although FIG. **1** shows the household metering apparatus **14** being located in the vicinity of the television **24**, it should be appreciated that the sensors **48** may be located near the television **24** but that the household metering apparatus **14** may be located remotely from the television **24**.

What is claimed is:

**1**. An audience measurement system for collecting program identifying data associated with a program which is transmitted from a signal source and to which a receiver is tuned, the audience measurement system comprising:

a first data collector, wherein the first data collector ranged to collect first program identifying data, wherein the first data collector is a code reader arranged to read an ancillary code of the program to which the receiver is tuned, and wherein the first program identifying data includes the ancillary code;

a second data collector, wherein the second data collector is arranged to collect second program identifying data, and wherein the second program identifying data is manually entered by a user of the receiver; and,

wherein the second data collector is arranged to collect the second program identifying data if the code reader cannot read the ancillary code in the program received by the receiver.

**2**. The audience measurement system of claim **1** wherein the second data collector comprises a sensor responsive to a remote control operated by the user of the receiver.

**3**. The audience measurement system of claim **1** further comprising a people identifier, wherein the people identifier is arranged to identify individual people in a monitored audience.

**4**. The audience measurement system of claim **3** arranged to time stamp and store the second program identifying data and information relating to any identified people in the monitored audience.

**5**. The audience measurement system of claim **3** arranged to time stamp and store the ancillary code and information relating to any identified people in the monitored audience.

**6**. The audience measurement system of claim **3** arranged to time stamp and store the ancillary code and information relating to any identified people if the ancillary code is readable and to time stamp and store the second program identifying data and information relating to any identified people in the monitored audience if the ancillary code is not readable.

**7**. An audience measurement system for collecting program identifying data associated with a program which is transmitted from a signal source and to which a receiver is tuned, the audience measurement system comprising:

a first data collector, wherein the first data collector is arranged to collect first program identifying data, wherein the first data collector is a code reader arranged to read an ancillary code of the program to which the receiver is tuned, and wherein the first program identifying data includes the ancillary code;

a second data collector, wherein the second data collector is arranged to collect second program identifying data, and wherein the second program identifying data is manually entered by a user of the receiver; and,

wherein the audience measurement system is arranged to time stamp and store the ancillary code if the ancillary code is readable and to time stamp and store the second program identifying data if the ancillary code is not readable.

8. An audience measurement system comprising:

a first data collector, wherein the first data collector is arranged to collect first program identifying data, wherein the first data collector is a code reader arranged to read an ancillary code of the program to which the receiver is tuned, and wherein the first program identifying data includes the ancillary code;

a second data collector, wherein the second data collector is arranged to collect second program identifying data, and wherein the second program identifying data is manually entered by a user of the receiver

a memory, wherein the memory stores the ancillary code read by the code reader if the ancillary code is readable by the code reader and stores the second program identifying data collected by the second data collected only if the ancillary code is not readable by the code reader.

9. The audience measurement system of claim 8 further comprising a people identifier, wherein the people identifier is arranged to identify individual people in a monitored audience.

10. The audience measurement system of claim 9 wherein the people identifier is arranged to passively identify individual people in a monitored audience.

11. The audience measurement system of claim 9 wherein the people identifier comprises keys.

12. The audience measurement system of claim 9 wherein the memory is arranged to store time stamped second program identifying data and time stamped information relating to any identified people in the monitored audience.

13. The audience measurement system of claim 9 wherein the memory is arranged to store time stamped ancillary codes and time stamped information relating to any identified people in the monitored audience.

14. The audience measurement system of claim 8 wherein the second data collector comprises a sensor responsive to a remote control manually operated by the user of the receiver.

15. The audience measurement system of claim 8 wherein the second data collector comprises a prompter, and wherein the prompter is arranged to prompt the user to manually enter the second program identifying data.

16. The audience measurement system of claim 15 wherein the prompter is arranged to provide prompts in the form of on-screen prompts.

17. The audience measurement system of claim 15 wherein the prompter comprises a transducer for providing prompts to a user.

18. The audience measurement system of claim 17 wherein the transducer provides a visual display.

19. The audience measurement system of claim 17 wherein the transducer provides an audio signal.

20. The audience measurement system of claim 17 wherein the transducer provides a synthesized voice message from a speaker.

21. The audience measurement system of claim 8 wherein the memory is arranged to store time stamped second program identifying data.

22. The audience measurement system of claim 8 wherein the memory is arranged to store time stamped ancillary codes.

23. The audience measurement system of claim 8 wherein the second data collector comprises manually operable keys.

24. A method of collecting program identifying data related to programs received by a receiver located within a building, the method comprising the steps of:

a) detecting signals corresponding to the programs;

b) if a detected signal includes an ancillary code, reading the ancillary code from the signal, wherein the ancillary code is related to a program corresponding to the detected signal;

c) if the detected signal does not include an ancillary code, collecting manually entered program identifying data related to the program corresponding to the detected signal, wherein steps a), b), and c) are performed within the building;

d) forwarding the ancillary codes and the manually entered program identifying data to a remote building;

e) if the detected signal includes an ancillary code, comparing, in the remote building, the ancillary code with a first library to thereby identify the program; and

f) if the detected signal does not include an ancillary code, comparing, in the remote building, the manually entered program identifying data with a second library to thereby identify the program.

25. A method of collecting program identifying data related to programs received by a receiver located within a building, the method comprising the steps of:

a) detecting a signal corresponding to the programs;

b) reading ancillary codes from the signal, wherein the ancillary codes are related to at least some of the programs;

c) collecting manually entered program identifying data related to at least some programs to which the ancillary codes are not related, wherein steps a), b), and c) are performed within the building; and

wherein, for one of the programs, step c) is performed only if an ancillary code cannot be read from the one program in step b).

26. A method of collecting program identifying data related to programs received by a receiver located within a building, the method comprising the steps of:

a) detecting a signal corresponding to the programs;

b) reading ancillary codes from the signal, wherein the ancillary codes are related to at least some of the programs;

c) collecting manually entered program identifying data related to at least some programs to which the ancillary codes are not related, wherein steps a), b), and c) are performed within the building;

d) identifying the at least some programs to which the ancillary codes are related from the ancillary codes;

e) identifying the at least some programs to which the ancillary codes are related from the manually entered program identifying data; and,

wherein, for one of the programs, step e) is performed only if the one of the programs cannot be identified from corresponding ancillary codes.

27. A method of collecting program identifying data related to programs received by a receiver located within a building, the method comprising the steps of:

a) detecting a signal corresponding to the programs;

b) reading ancillary codes from the signal, wherein the ancillary codes are related to at least some of the programs;

c) collecting manually entered program identifying data related to at least some programs to which the ancillary codes are not related, wherein steps a), b), and c) are performed within the building; and,

wherein step c) further comprises the step of prompting a user to manually enter the manually entered program identifying data only if the ancillary codes cannot be read in the programs received by the receiver.

28. A method of measuring audiences in a plurality of statistically selected households, the method comprising the steps of:

a) in each of the statistically selected households, detecting a signal corresponding to a program to which a receiver is tuned;

b) in each of the statistically selected households, reading an ancillary code from the signal when the ancillary code is present in the program; and,

c) in each of the statistically selected households, collecting manually entered program identifying data related to the program, wherein step c) is performed only in the event that the ancillary code cannot be read from the signal.

29. The method of claim **28** further comprising the step of associating an identity of an audience member with the ancillary code or the manually entered program identifying data.

30. The method of claim **29** wherein the identity of the audience member includes the age and gender of the audience member.

31. The method of claim **28** wherein step c) comprises the step of collecting the manually entered program identifying data by use of a remote control and a sensor responsive to the remote control.

32. The method of claim **28** wherein step c) comprises the step of prompting a user to manually enter the manually entered program identifying data.

33. The method of claim **28** wherein steps a), b), and c) are performed by a portable metering apparatus.

34. A method of identifying a program to which a receiver is tuned, the method comprising the steps of:

a) detecting a signal corresponding to the program;

b) reading an ancillary code when the ancillary code is readable in the signal;

c) collecting manually entered program identifying data relating to the program;

d) identifying the program from the ancillary code if the ancillary code is readable; and,

e) identifying the program from the manually entered program identifying data only if the ancillary code is not readable.

35. The method of claim **34** comprising the further step of associating an identity of an audience member with the ancillary code or the manually entered program identifying data.

36. The method of claim **34** wherein step c) comprises the step of detecting the manually entered program identifying data by use of a remote control and a sensor responsive to the remote control.

37. The method of claim **34** wherein step c) comprises the step of prompting a user to manually enter the manually entered program identifying data.

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